SOV/133-58-11-5/25

AUTHOR: ~~Lifshits, S.I.,~~ Candidate of Technical Sciences

TITLE: The Production of Various Steels in Top Oxygen-blown Basic Converters (Proizvodstvo razlichnykh staley v osnovnykh konverterakh pri produvke kislorodom sverkhu)

PERIODICAL: Stal', 1958, Nr 11, pp 979 - 983 (USSR)

ABSTRACT: The results of production of some rimming and killed steels in oxygen top-blown basic converters are described. 1) Steel for crane rails (C 0.50-0.73%, Mn 0.6-1.0%, Si 0.15-0.30%, S $\leq$ 0.050, P $\leq$ 0.055). The results for 1 039 heats are analysed. Frequency distribution of carbon, manganese, sulphur and phosphorus are given in Table 1. The results obtained indicated that in order to produce steel containing not more than 0.05% sulphur, it is necessary: a) to use pig iron containing not more than 0.7% of silicon and 0.06% of sulphur and not less than 1.5% of manganese; b) to increase the content of iron oxides in slag in order to improve its formation; c) to avoid, during the process of obtaining metal, temperatures below 1 600 °C and above 1 650 °C (in order to avoid difficulties in de-phosphorisation). Technological conditions of smelting are described in some detail. The content of gases in steel was lower than in

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The Production of Various Steels in Top Oxygen-blown Basic Converters

corresponding Bessemer steel. Strength characteristics of the rail steel blown with oxygen are somewhat lower and plasticity characteristics somewhat higher than those of the corresponding Bessemer steel. External defects of rails tested were of the usual origin and were not related to any special features of oxygen smelting.
2) Steel 2532S (C 0.20-0.29%, Mn 1.2-1.6, Si 0.6-0.9, S $\leq$ 0.050, P $\leq$ 0.050), low-alloy steel for periodic profiles. Smelting conditions are briefly outlined. Frequency distribution of the mechanical properties of the rolled product are given in Figure 2. With high strength characteristics, the specific elongation of steel was higher than that of open-hearth metal.
3) Rimming steels SV-08 and T.

	C	Mn	Si	S	P
SV-08	$\leq$ 0.10	0.40-0.55	$\leq$ 0.03	$\leq$ 0.038	$\leq$ 0.038
T	$\leq$ 0.11	$\leq$ 0.50	traces	$\leq$ 0.050	$\leq$ 0.045%.

For SV-08 steel, the sulphur content of pig should be below 0.06%. Some features of smelting technology are briefly mentioned.

The Production of Various Steels in Top Oxygen-blown Basic Converters

4) Experimental production of steels 10 and 20 for drawn tubes, 23 heats of steel 10 and 13 heats of steel 20 were produced. There were no difficulties in obtaining the required composition providing the pig iron contained no more than 0.06% sulphur and no less than 1.5% of manganese. Mechanical properties of steels were satisfactory. The content of oxygen and hydrogen in the above steel was lower and the content of nitrogen somewhat higher than in corresponding open-hearth steels. The experimental results are considered satisfactory but for the final conclusions more work is considered necessary.

5) Experimental heats of steel 45 for rolling periodic profiles (motor-car axles). The required composition, C 0.43-0.48%, Mn 0.50-0.80, Si 0.17-0.37, S and P $\leq$ 0.039, was difficult to maintain, particularly in respect of carbon. Mechanical properties of steel produced exceeded standard requirements. In view of difficulties in maintaining the required composition, the experiments were discontinued. It is concluded that in order to widen the range of converter steels, further investigation on the

The Production of Various Steels in Top Oxygen-blown Basic Converters

desulphurisation of metal (so as to be able to utilise all basic pig iron produced) and on stopping the process at a required composition are necessary.
There are 2 figures and 2 Soviet references.

ASSOCIATION: Zavod im. Petrovskogo (Plant Imeni Petrovskiy)

SOV/133-59-9-7/31

AUTHOR: Lifshits, S. I., Candidate of Technical Sciences

TITLE: The Durability of the Lining of Basic Convertors Operating with Oxygen Blast

PERIODICAL: Stal', 1959, Nr 9, pp 793-795 (USSR)

ABSTRACT: The influence of various factors of blowing technology on the durability of convertor lining made from periclase-spinel and magnesite-chromite bricks was investigated. The composition of pig iron used: % Si, 0.5 to 0.9; Mn, 1.2 to 1.8; S, 0.04 to 0.07; P, 0.08 to 0.10. As a cooling agent additions of ore (6.5 to 8.6% of the weight of the charge) were used. The consumption of lime was 7 to 9% and bauxite 0.3 to 0.8%. Mainly low carbon rimming steel was produced. Consumption of oxygen - 49 m^3/ton (99% purity). The duration of blowing was 16 minutes and of the whole heat 30 minutes. The relationship between the content of silica and magnesia in primary slags is shown in Table 1; the influence of silicon content of iron on the mean durability of the lining - Fig 1 and 2; the influence of silica content of slag and the influence of the basicity of the final slag on the durability

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The Durability of the Lining of Basic Convertors Operating with Oxygen Blast

of the lining - Fig 3 and 4 respectively; the dependence of the durability of the lining on the number of overheated heats - Table 2. The influence of specific volume of convertor on the durability of the lining is demonstrated by the following data:

Mean durability of lining at sp vol of the convertor 0.7 m^3/t	126 heats (115-148)
- ditto - at 1.0 m^3/t (after increasing the diameter of the convertor without increasing the weight of charge)	158 heats (142-181)
- ditto - at 0.78 m^3/t (by increasing the weight of charge)	148 heats (144-160).

The wear of the lining in convertors of different shapes is shown in Fig 5 and 6. It is concluded that in addition to the quality of the refractory, the durability of the lining of the top oxygen blown convertors depends on the number of technological factors: a) the durability of lining increases sharply on decreasing the silicon content of iron approximately to 0.2 to 0.3% (this can be

The Durability of the Lining of Basic Convertors Operating with Oxygen Blast

achieved by a preliminary desiliconization of iron); b) the durability of lining decreases with increasing content of silica in slag and a decnease in its basicity below 2.5 as well as with increasing number of overheated heats (with temperature above 1650°C). Specific volume of convertors should not be lower than 1 m^3/ton of the charge. An acceleration of the formation of slag of a basicity above 2.5 would increase the durability of the lining; a decrease in the bath diameter is particularly advantageous. There are 6 figures and 2 tables.

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PHASE I BOOK EXPLOITATION SOV/4242

Lifshits, Saveliy Iosifovich

Proizvodstvo stali v konverterakh (Converter Steel Making) Moscow, Metallurgizdat, 1960. 262 p. Errata slip inserted. 3,650 copies printed.

Ed.: A.Ye. Netesin; Ed. of Publishing House: S.L. Zinger; Tech. Ed.: P.G. Islent'yeva.

PURPOSE: The book is a manual for training skilled workers of converter plants. Some chapters may be useful to metallurgical engineers and students of schools of higher education.

COVERAGE: The latest methods of converter steel production are described and the fundamentals of physical chemistry required to understand the converter processes are presented along with the principles of converter arrangement and an explanation of the blowing process. Material and heat balances of Bessemer, Thomas, and oxygen-blast processes are examined. Also discussed are the basic concepts of work organization, the technico-economic indices, and the production costs of steel.

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LIFSHITS, S.I.

S/130/60/000/008/007/009

AUTHORS: Zaykov, S.T., Kravtsov, P.Ya., Lifshits, S.I.

TITLE: Putting Into Production New Steel Grades Melted in Oxygen Converters

PERIODICAL: Metallurg, 1960, No. 8, p. 15

TEXT: The following steel grades are now being produced in oxygen converters at the Plant imeni Petrovskiy and the Krivoy Rog Plant: rimming "T", Cv08 (Sv08), KCt.2 (KSt.2), KCt.3 (KSt.3), KCt.0 (KSt.0) steel and killed 25G2C (25G2S), 35GC (35GS), KCt.5 (KSt.5), KP62 (KR62), Cv08A (Sv08A), K10 and K20 pipe steel. In Sv08A steel the permissible sulfur and phosphorus content is not over 0.030%. The production of oxygen converter steel with a low P and S content is not particularly difficult. It was established by experimental investigations that steel with a sulfur content below 0.03% may be obtained of cast iron containing 0.05% S. This is attained by repeated removal of the slag and the addition of fluorspar in an amount of 2 kg/t of metal. However, the repeated drawing-off the slag increases the melting time by 15-20% and reduces the yield by 0.7-1.2%. K10 and K20 pipe steel was melted in an oxygen converter. The

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S/130/60/000/008/007/009

Putting Into Production New Steel Grades Melted in Oxygen Converters

finished product met the requirements to standards and the gas content was low. The rolling of the blanks into seamless pipes was easily possible. The pipe tests proved satisfactory.

ASSOCIATION: Ukrainskiy institut metallov (Ukrainian Institute of Metals), Zavod imeni Petrovskogo (Plant imeni Petrovskiy)

Card 2/2

LIFSHITS, S.I., kand.tekhn.nauk

Iron balance in the converter process with top oxygen blow. Stal' 21 no.2:109-110 F '61. (MIRA 14:3)
(Bessemer process)

S/137/61/000/010/006/056
A006/A101

AUTHORS: Zaykov, S. T., Kravtsov, P. Ya., Lifshits, S. I.

TITLE: Assimilation of melting new steel grades in converters with oxygen blast

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 10, 1961, 36, abstract 10V240. ("Metallurg i gornorudn. prom-st'. Nauchno-tekhn. sb.", 1960, no. 4, 25 - 27)

TEXT: At the plant imeni Petrovskiy and "Krivorozhstal'" the following rimming steel grades are now being melted in converters with O_2 blast: T - for telegraph wire; CB-08 (SV-08) and CB-08A (SV-08A) for electrode wire (S up to 0.040%, and up to 0.030%), K-2, K-3, K-0 for small iron ware; K-5 and KP-62 (KR-62) for crane rails; 25Г2С (25G2S) low-alloy steel for reinforcement wire of variable profile. Further enlargement of the assortment was studied, namely the melting of high-quality CB-08A (SV-08A), K-10 and K-20 pipe steel. It was found that when converting cast iron with S < 0.05%, steel with S < 0.030% can be obtained, if the slag is removed twice and fluorspar (2 kg/t of steel) is added. The repeated slag removal extends the melting time by 15 - 20% and reduces the

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S/137/61/000/010/006/056
A006/A101

Assimilation of melting new steel grades in...

yield by 0.7 - 1.2%. Further investigations showed that SV-08A steel can be melted from cast iron with S < 0.05% and Mn > 1.5% if only fluorspar is used without removing the primary slag. K-10 and K-20 pipe steel was melted. Teeming was performed by the syphon method into molds with risers. The ingot weight was 4.20 - 4.45 t. The steel contained 0.0091% [O], 0.0065% [N] and 4.69 ml/100 g [H]. All the mechanical and technological tests of the pipe specimens yielded satisfactory results.

P. Arsent'yev

[Abstracter's note: Complete translation]

Card 2/2

BEDA, N.I., inzh.; RYZHKOV, P.Ya., inzh.; GORYUCHKO, I.G., inzh.; MASHKOVA, A.K., inzh.; Prinimali uchastiye: LIFSHITS, S.I.; KOTOV, N.K.; KOSHCHEYEV, A.D.; CHUVICHKINA, N.K.; KOLPOVSKIY, N.M.; GOLOVKO, O.F.; LUDENSKIY, A.M.; SERBIN, I.V.; IVANOV, I.T.; ALEKSEYEVA, N.V.; MENDEL'SON, N.Ya.

Quality of pipe billets and p es made of killed converter steel. Stal' 21 no.9:824-825 S '61. (MIRA 14:9)

1. Metallurgicheskiy zavod im. Petrovskogo i Truboprokatnyy zavod im. Lenina.

(Pipe, Steel)

ZAYKOV, Solomon Tevovich, kand. tekhn. nauk; LIFSHITS, Saveliy Iosifovich, kand. tekhn. nauk; MAL'KOV, B.G., inzh., retsenzent; CHUMACHENKO, T.I., red.izd-va; BEREZOVYY, V.N., tekhn. red.

[Steelmaking in oxygen-blown converters] Vyplavka stali v kislorodnykh konvertorakh. Kiev, Gostekhizdat USSR, 1963. 181 p. (MIRA 17:2)

LIFSHITS, S.I., kand.tekhn.nauk; ZHIGULIN, V.I., inzh.; RUBINSKIY, P.S., inzh.

Making low-alloy brands of steel in the oxygen-converter department of the Petrovskii Plant. Stal' 23 no.12:1082-1085 D '63. (MIRA 17:2)

LIFSHITS, S.I., kand. tekhn. nauk

Role of manganese in the oxygen-blown converter process of steel production. Met. i gornorud. prom. no.3:26-27 My-Je '64. (MIRA 17:10)

LIFSHITS, Savelly Iosifovich; ZHIGULIN, Vladimir Ivanovich; RUBINSKIY, Petr Samoylovich

[Making oxygen-blown converter steel] Proizvodstvo kislorodno-konvertornoi stali. Moskva, Metallurgiia, 1965. 95 p. (MIRA 18:7)

ZAYKOV, S.T.; KRAVTSOV, P.Ya.; NIKIFOROV, B.V.; KOVAL', V.Ye.; ZHIGULIN, V.I.; RUBINSKIY, P.S.; LIFSHITS, S.I.; YEVSTAF'YEV, Ye.I.; NIKONOV, V.F.; VOZLINSKIY, A.G.

Using oxygen-blown converter steel in automobile manufacture. Met. i gornorud. prom. no.4:26-31 Jl-Ag '64. (MIRA 18:7)

LIFSHITS, S.G.

Bibliography of Russian scientific literature on oncology published during 1958. Vop.onk. 7 no.2:121-126 '61. (MIRA 14:5)

(BIBLIOGRAPHY--TUMORS)

LIFSHITS, S.I., kand.tekhn.nauk

Effect of blowing conditions on the converter process with a top oxygen blow. Stal' 21 no.12:1074-1075 D '61. (MIRA 14:12)

(Converters)
(Oxygen--Industrial applications)

LIFSHITS, S.M. (Kiyev)

Retrograde amnesia in psychogenic reactions and its significance in forensic psychiatry. Probl.sud.psikh. 9:157-160 '61. (MIRA 15:2)

(AMNESIA) (FORENSIC PSYCHIATRY) (MENTALLY ILL)

VINARSKAYA, N.M. (Kiyev); LIFSHITS, S.M. (Kiyev)

Psychogenic reactive mechanisms of self-accusations. Probl.sud. psikh. 9:212-215 '61. (MIRA 15:2)
(MENTAL ILLNESS)

ZAKHARENKO, Semen Yefremovich, prof.; ANISIMOV, Sergey Aleksandrovich, dots.; DMITREVSKIY, Vladimir Alekseyevich, dots.; KARPOV, Grigoriy Vasil'yevich, dots.; FOTIN, Boris Stepanovich, dots.; RUMYANTSEV, V.A., kand. tekhn. nauk, retsenzent; ROZENFEL'D, L.M., doktor, tekhn. nauk, retsenzent; LIFSHITS, S.P., kand. tekhn. nauk, red.; VASIL'YEVA, V.P., red. izd-va; DUDUSOVA, G.A., red. izd-va; SIMONOVSKIY, N.Z., red. izd-va; SHCHETININA, L.V., tekhn. red.

[Piston compressors] Porshnevye kompressory. Moskva, Gos. nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1961. 454 p. (MIRA 14:8)
(Compressors)

LIFSHITS, S. S.

"Reasons for Rejection of Medium Carbon Steel in the Macro-Inspection and Means of Prevention," Stal', 10, No.10, pp. 20-23, 1940

Evaluation B-59660

LIFSHITS, S. S.

Povyshenie koefitsienta poleznogo deistviia ispol'zovaniia energi szhatogo vozdukha na mashinostroitel'nykh zavodakh. (Vestn. Mash., 1949, no. 4, p. 56-60)

/Increased efficiency of compressed energy utilization in machine-building plants./

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

LIFSHITS, S. S.

Parevoi i gidravlicheskii privod kovochnykh pressov. (Vestn. Mash., 1951, no. 7, p. 48-54)

The steam and the hydraulic drive of forging presses.

DLC: TN4.V4

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953

LIFSHITS, S. S.

B. T. R.
Vol. 3 No. 4
Apr. 1954
Metals-Mechanical Working

5137* Increasing Efficiency of Forge Hammers. (Russian) S. S. Lifshits. *Vestnik Mashinostroeniia*, v. 33, no. 9, Sept. 1953, p. 57-58.

Discusses possibility of increasing efficiency from 1.5 to 2 times and of decreasing steam expenditure by 30-50%. Tables, diagrams.

LIFSHITS, S.S.

Multilayer ovens without heating surfaces in the baking chamber. Khleb.i kond.prom. 1 no.6:44-46 Je '57. (MLRA 10:8)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut khlebopekarnoy promyshlennosti.
(Germany--Ovens)

LIFSHITS, S. Ya.

"Quantum Discontinuity of Light and Discreteness of Sensations." Zhur. Tekh. Fiz., 14, No. 10-11, 1944. Physico-Technical Lab., Uzbek Affiliate, Acad, Sci. SSSR.

PA 38T71

LIFSHITS, S. YA

USSR/Medicine - Hearing Tests Nov 1947
Medicine - Reflex, Aural

"Selective Intensifying of Sound Impulse Hearing," S. Ya. Lifshits, 4 pp

"Dok Ak Nauk" Vol LVIII, No 5

In a previous work it was established that the nervous system does not receive sound the instant it is transmitted but only after the eighth discharge in the nervous system. Author describes experiments conducted to prove his contention that the ear does receive a sound, even a low impulse sound, if beforehand the ear is subjected to a prolonged constant tone of the same frequency as the impulse of the sound. Submitted by Academician L. A. Orbeli, 9 Apr 1947. 38T71

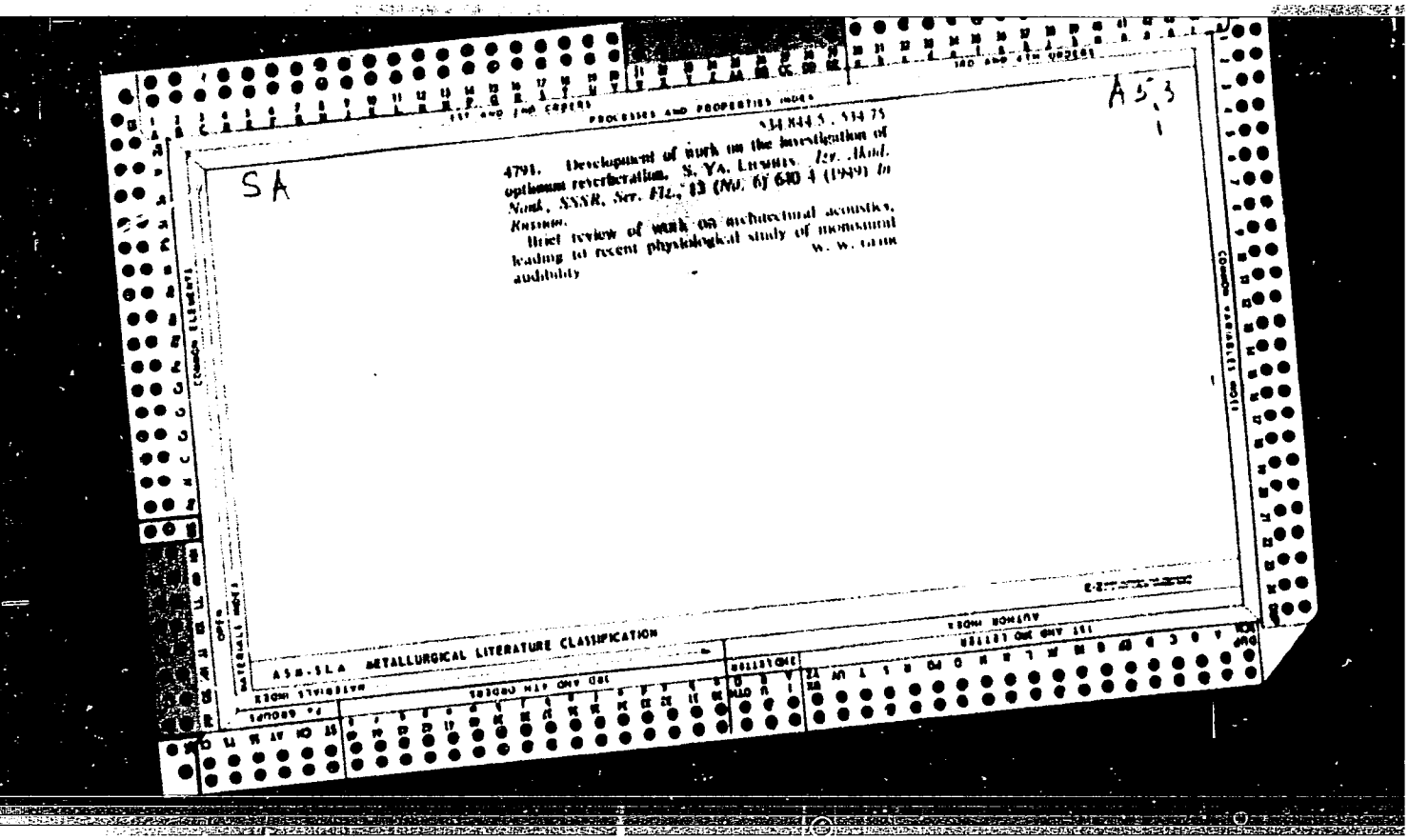
LIFSHITS, S. Ya.

"Blunting of the Vibrational Sense of Touch during the Action of Sound on the Ear," Dokl. AN SSSR, 60, No. 4, 1948;

LIFSHITS, S. Ya.

LIFSHITS, S.Ya.

Fluctuations of sensitivity, phenomena of accumulation and intermittance during the action of threshold and stronger stimulations upon sense organs. Probl.fiziol.akust. 1:45-62 '49 (MIRA 10:11)
(SENSES AND SENSATION)



PA 52/49T62

LIFSHITS, S. YA.

USSR/Medicine - Hallucinations May 49
Medicine - Hearing, Disorders

"Investigation of the Intensity of Auditory Hallucinations," S. Ya. Lifshits, 1½ pp

"Dok Ak Nauk SSSR" Vol LXVI, No 3

Purpose of study is to compare subjective intensity of auditory hallucinations with objective level of intensity of an external source of sound. Three types were studied with a sonic vibrator. First and second, having no objective intensity, are assumed to originate in the sound representation center. Third, masking the external tone, is assumed to arise in the auditory perception center. Submitted by Acad L. A. Orbeli, 22 Mar 49

52/49T62

LIFSHITS, S. Ya.

"Standardization of Measurements of the Threshold of Sound," a report read at the conference of the Acoustics Commission AS USSR held in Leningrad 1-3 Feb 51

M-21610, 25 Feb 52

LIFSHITS, S. Yu.

"Sensation Elements for Hearing and Touch," Dok. AN, 48, No. 7, 1954.

Jul 53

LIFSHITS, T. M.

USSR/Nuclear Physics - Electron Multipliers

"Application of Electron Multipliers for Counting of Elementary Particles and Quanta," T. M. Lifshits

Usp Fiz Nauk, Vol 50, No 3, pp 365-432

Review of foreign progress in applying modern methods of electron multiplying to counting of elementary particles and quanta. A total of 149 foreign references appended. The only recent Soviet source cited is S. F. Rodionov and A. L. Osherovich, DAN SSSR, 74,461 (1950), discussing the Kubetskiy photomultiplier (1300 volts), used as a photocounter with background noise of 12-45 pulses/min at 183°C and up to 320 pulses/min at 76°C. Author claims that the electron multiplier was invented in 1930 by L. A. Kubetskiy (Authorship Certificate No 24040 of 4 Aug 30).

262T73

LIFSHITS, T. M.

PHASE X TREASURE ISLAND BIBLIOGRAPHIC REPORT AID 605 - X

CHECHIK, N. O.; FAYNSHTEYN, S. M. and LIFSHITS, T. M.

"Electronic Multipliers," State Publishing House of Technical and Theoretical Literature, 1954. pp 420.

see card for CHECHIK, N. O. for further info.

LIFSHITS, T.M.

USSR/Electronics - Semiconductor Devices and Photocells, H-8

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35220

Author: Dorf, O. P., Kokina, N. G., Lifshits, T. M., Shklover, D. A.

Institution: None

Title: Photocells and Photomultiplier with Magnesium Photocathodes for Recording Ultraviolet Radiation

Original Periodical: Radiotekhnika i elektronika, 1956, 1, No 1, 106-113

Abstract: Up to 250 vacuum photocells with magnesium photocathodes, intended for operation in the ultraviolet region (from approximately 3500 A) have been prepared and tested. A reproducibility of the spectral characteristic from specimen to specimen of approximately 10% was attained. A magnesium photomultiplier with low dark current was also prepared, making it possible to record radiation fluxes up to 10^{-15} watt at $\lambda = 2537$ A.

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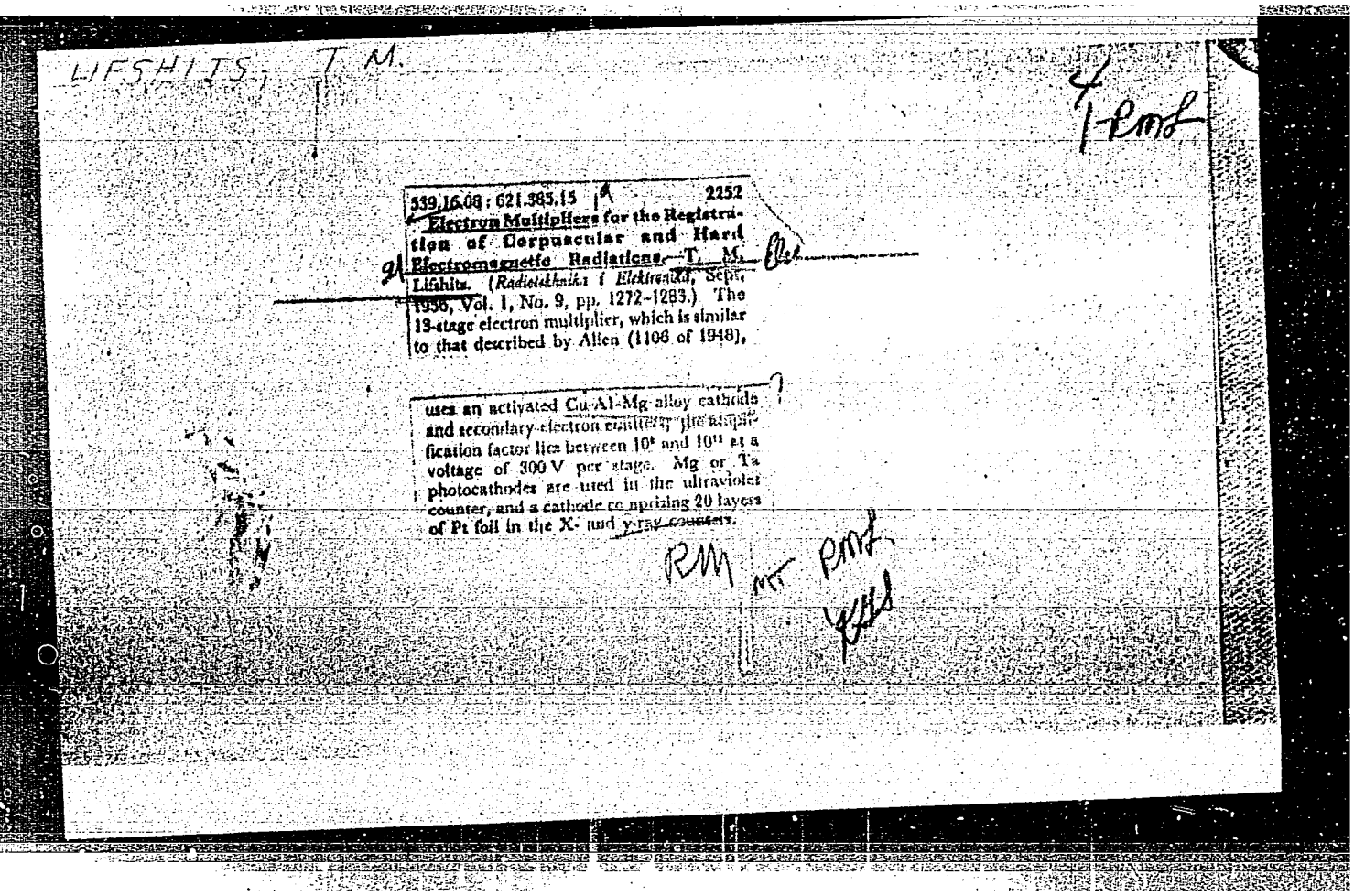

LIFSHITS, T. M.

4 Prof

539.16.08 : 621.385.15 2252

Electron Multipliers for the Registration of Corpuscular and Hard Electromagnetic Radiations. T. M. Lifshits. (*Radiotekhnika i Elektronika*, Sept. 1956, Vol. 1, No. 9, pp. 1272–1283.) The 13-stage electron multiplier, which is similar to that described by Allen (1106 of 1948), uses an activated Cu-Al-Mg alloy cathode and secondary-electron emitters; the amplification factor lies between 10^5 and 10^{11} at a voltage of 300 V per stage. Mg or Ta photocathodes are used in the ultraviolet counter, and a cathode comprising 20 layers of Pt foil in the X- and γ-ray counters.

RM not part

LIFSHITS, T. M.

"Electron Multipliers for Recording of Corpuscular and Hard Electromagnetic Radiations," by T. M. Lifshits, Institute of Radio Engineering and Electronics, Academy of Sciences USSR, Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, Vol 20, No 9, Sep 56, p 1038 (abbreviated report)

An activated Cu-Al-Mg alloy was tested for its properties as an emitter and electron multiplier. This emitter secures a good amplification factor of six to seven at a 300 V primary electron energy. In a 13-stage multiplier operating at 4 kV, the amplification factor was 10^9-10^{11}, the "dark" pulses not exceeding 5-8 per minute. When air was allowed into the multiplier its amplification factor decreased "twofold." The multiplier is suitable for recording ultraviolet radiation of 3,000-1,900 Å and also is useful in X-ray defectoscopy.

Sum 1258

CHECHIK, Nikolay Oskarovich; FAYNSHTEYN, Semen Meyerovich; LIFSHITS, T.M., Teodor Moiseyevich; ZERNOV, D.V., redaktor; ZHABOTINSKIY, Ye.Ye., redaktor; GAVRILOV, S.S., tekhnicheskiy redaktor

[Electron multipliers] Elektronnye umnozhiteli. Izd.2-oe,dop. i perer. Pod red. D.V.Zernova. Moskva, Gos.izd-vo tekhniko-teoret.lit-ry, 1957. 575 p. (MLRA 10:7)
(Photoelectric multipliers)

PA - 2583

AUTHOR: LIFSHITS,T.M., YASNOPOL'SKAYA,A.A.

TITLE: Interdepartmental Seminar on Cathode Electronics. (Mezhduvedomstvennyy seminar po katodnoy elektronike, Russian)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol 2, Nr 2, pp 253-255 (U.S.S.R.)
Received: 4 / 1957 Reviewed: 7 / 1957

ABSTRACT: The Commission for Cathode Electronics of the Electronic Sector of the All-Union Soviet for Radio Physics and Radiotechnology of the Academy of Science of the U.S.S.R. decided to establish an interdepartmental Seminar for Cathode Electronics. This seminar will investigate the situation and the possibilities of development of the main fields of scientific research in cathode electronics, and will further supervise work carried out within the field of the physics of various kinds of electron emission and cathode technology carried out by academical scientific research institutes, in construction offices, works laboratories, and institutes. On December 12th 1956 lectures were delivered on the physics of photoelectrons and secondary electron emission. A.R. SHUL'MAN spoke about "Some Peculiarities of the Secondary Electron Emission of Metals and Dielectrics". He gave a survey of the work carried out in recent years within this field. N.L. YASNOPOL'SKIY and A.E.DYKLOP spoke about the method worked out in the laboratory IRE of the Academy of Science of the U.S.S.R. for measuring the coefficient of secondary electron

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PA - 2583

Interdepartmental Seminar on Cathode Electronics.

emission σ of dielectric targets used in electron radiation tubes. A.A. MOSTOVSKIY spoke about the "Tendency of Research Work within the fields of the Exterior and Interior Photoeffect and Secondary Emission". I.V.AL'TOVSKIY dealt with "Some Peculiarities of Photo-electron Emission of Oxygen-Cesium Electrodes".

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED: 14.12. 1956
AVAILABLE: Library of Congress

Card 2/2

SOV/109-3-8-17/18

AUTHORS: Alekseyeva, A.P., Basalayeva, N.Ya., Yelinson, M.I., Zernov, D.V., Kul'varskaya, B.S., Lifshits, T.M., Savitskaya, Ya.S., Sena, L.A., Shabel'nikova, A.E. and Yurasova, V.Ye.

TITLE: The Eighth All-Union Conference on Cathode Electronics (8-ye vsesoyuznoye soveshchaniye po katodnoy elektronike)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 8, pp 1092 - 1103 (USSR)

ABSTRACT: The conference took place during October 17 - 24, 1957 in Leningrad at the Fiziko-tekhnicheskiy institut AN SSSR (Physics-engineering Institute of the Ac.Sc.USSR). It was organised by the Soviet Ac.Sc. and was attended by Soviet scientists from Moscow, Leningrad, Kiyev and other towns of the Soviet Union as well as by delegates from Hungary, Czechoslovakia and Romania. Altogether, over one hundred lectures were delivered at the conference. These were divided into the following sections: thermionic emission and the technology of thermionic cathodes; secondary electron emission; photo-electron emission; field electron emission; cathode conductivity phenomena; ionic processes and gas discharges. Some of the papers

Cardl/2

read at the conference are published in the present issue of the journal: in fact, all the papers in this issue were read at the conference. Some of the papers were published in an earlier issue of the journal (Vol 2, Nr 12, 1957). A number of papers from the conference are being published in "Izvestiya AN SSSR, Ser. Fiz." Nrs 4 and 5 and also in various other journals. The present report gives brief summaries of a large number of the papers presented at the conference.

SUBMITTED: February 4, 1958

 1. Cathodes (Electron tube) 2. Thermionic emission 3. Secondary emission 4. Photoemission 5. Field emission

SOV/109-3-9-10/20

AUTHORS: Lifshits, T.M., Kokina, N. G.

TITLE: Photocathodes for the Registration of the Ultraviolet, Based on the Alloys of Magnesium and Barium (Fotokatody dlya registratsii ul'trafioleta na osnove splavov magniya s bariyem)

PERIODICAL: Radiotekhnika i elektronika, 1958, Vol 3, Nr 9, pp 1199-1203 (USSR)

ABSTRACT: In order to secure an improvement in the performance of magnesium photocathodes, the authors investigated the photo-electric parameters of a whole range of magnesium and barium alloys. The experimental samples were obtained by evaporating the coating material onto the body of a photo-cell in vacuum. The coating alloys had barium contents of 1, 2.3, 8.5, 16.2 and 30%. These alloys were prepared in the Institute of Metallurgy of the Soviet Academy of Sciences. The evaporation was done by means of a tungsten helix in a vacuum of about 10^{-7} mm Hg; six samples were prepared from each alloy. The photo-electric characteristics of the cathodes were measured by means of the spectrophotometer,

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Photocathodes for the Registration of the Ultraviolet, Based on the Alloys of Magnesium and Barium

type SF-4, which as used as a monochromator. The experimental results are shown in Figs.1-5. The curves of Fig.1 show the spectral sensitivity of the cathodes as a function of the illuminating wavelength; the sensitivity is given in μA per mW. The relative sensitivity of the cathodes is shown in Fig.2. Here it is found that the cathodes become more selective as the amount of barium increases and the maximum is shifted towards the longer wavelengths; the maximum sensitivity occurs at λ = 290 mμ when the cathode contains 8% of barium (see Fig.1 and Fig.2). Similar results were obtained with magnesium-barium cathodes of variable thickness (edge-like cathodes) which were prepared by depositing a 2.3% Mg-Ba alloy on a flat polished quartz plate; the resulting curves of the relative sensitivity for various thicknesses of the wedge (ranging from 2250 to 150 Å) are shown in Fig.3. The spectral distribution of the photo-electric work function for a cathode with 30.5% alloy is shown in Fig.4. From this it follows that the photo-electric work function is of the order of 2.4 eV. An attempt was made to determine the photo-electric work function of the same cathode by using the Fowler method; the necessary

Photocathodes for the Registration of the Ultraviolet, Based on the Alloys of Magnesium and Barium

curves are shown in Fig.5; from these it is found that the work function is 2.47 eV. The authors express their gratitude to N. N. Sentyurina, who carried out all the chemical analyses, and to O. P. Dorf who supplied calibrated photoelectric cells and the source. The paper contains 5 figures and 3 references; 1 reference is English, 1 German and 1 Soviet.

SUBMITTED: March 10, 1958.

Card 3/3

SOV/109-3-10-11/12

AUTHORS: Lifshits, T.M. and Kokina, N.G.

TITLE: Semi-transparent Photo-cathodes for the Registration of Ultra-violet Radiation (Poluprozrachnyye fotokatody dlya registratsii ul'trafioletovogo izlucheniya)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 10, p 1315 (USSR)

ABSTRACT: The cathodes described were obtained by evaporation (in vacuum) of magnesium or magnesium-silver alloy. The magnesium-silver cathode could also be obtained by first evaporating magnesium and then silver; the quantity of the evaporated silver was such that the cathode contained 2-5 atomic layers. The overall thickness of the cathodes was of the order of 200-300 Å ; this thickness corresponded to the maximum sensitivity. At the wavelength of 254 mμ, the sensitivity of magnesium cathodes was of the order 0.2 μA/mW and that of the magnesium-silver cathode was 0.6 μA/mW.

SUBMITTED: February 20, 1958

Card 1/1 1. Cathode ray tubes--Applications 2. Ultraviolet radiation --Detection

S/109/60/005/008/011/024
E140/E355

9,4160(3201, 1003, 1137)

AUTHORS: Lifshits, T.M., Kokina, N.G. and Politova, N.M.

TITLE: Photoelectric Properties of Barium-magnesium Alloys

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol. 5, No. 8, pp. 1267 - 1274

TEXT: A continuation of earlier work (Ref. 1) with the purpose of establishing whether the phenomena observed are of a surface or a volume character. The experimental procedure excluded the possibility of the properties of the Mg-Ba photocathode being due to a barium film on a magnesium surface or oxidation of a surface layer of barium. It is postulated that a stable alloy is formed. The properties are stable in vacuum between 10^{-9} and 10^{-7} mm Hg. The alloy formed is of metallic character, as shown by comparison with pure Mg-photocathodes. The depth of the electron emission from the metal as a function of energy appears to be related to the appearance of a characteristic energy loss due to excitation of plasma oscillations. Their frequency could be determined

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S/109/60/005/008/011/024
E140/E355

Photoelectric Properties of Barium-magnesium Alloys

only by extending the light-absorption measurements into the far ultraviolet. The experimental results are interpreted as indicating the volume character of the photoeffect in this cathode and the connection between the maximum photoeffect with the maximum light absorption in the cathode. The spectral characteristic of the freshly-deposited barium layer (in vacuum 10^{-9} mm Hg) has a pronounced maximum at the wavelength 280 - 300 mμ. The same maximum appears in a magnesium-barium layer with 5-7% by weight of barium. The quantum efficiency reaches 7% of incident and 10% of absorbed light. A sharp increase of quantum efficiency begins at the wavelength of 220 mμ. There are 11 figures and 5 references: 2 Soviet and 3 non-Soviet. Acknowledgments are made to N.M. Sentyurina, V.I. Sidorov and M.A. Polyakova for their assistance.

SUBMITTED: December 21, 1959

Card 2/2

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S/056/62/042/004/006/037
B102/B104

24.7700
9.4178

AUTHORS: Lifshits, T. M., Kogan, Sh. M., Vystavkin, A. N., Mel'nik, P. G.

TITLE: Some effects induced by r-f irradiation in n-type indium antimonide

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 4, 1962, 959-966

TEXT: Some effects were studied which arise in n-type InSb at 4.2°K when irradiated with r-f electromagnetic waves of the mm-band. The samples were placed in a helium kryostat between the pole-pieces of an electromagnet and were irradiated by $75 \cdot 10^9$ cps modulated with 1000-cps square pulses; the irradiation intensity was $\sim 10^{-5}$ w/cm^{-2}. The carrier concentration in the samples at 80°K was $6.5 \cdot 10^{14}$ cm^{-3}; their mobility was $4 \cdot 10^4$ cm^2/v·sec. The volt-ampere characteristics were taken at several transverse magnetic field strengths; in not too weak electrical fields the conductivity increases with the field, a fact which agrees with the assumption that in

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S/056/62/042/004/006/037
B102/B104

Some effects induced by r-f ...

n-type InSb scattering from ionized impurities is predominant at 4.2°K. In weak fields the characteristics are nonlinear; the authors restrict themselves to positive nonlinearities, characterized by $\beta = [\sigma(E)]^{-1} d\sigma/dE^2$, σ being the conductivity. The emf observed is studied in connection with the following effects: (a) The bolometric effect (heating of the sample by irradiation): no indication. (b) Impurity photoeffect: no indication. (c) Effects at the contacts and the crystal grain boundaries: Effects are unclear; it is improbable that they play a role. (d) Heating of the electron gas by irradiation (change of the energy distribution of the conduction electrons): The emf signal observed in non-zero magnetic field and $v = 0$ (which cannot be attributed to an impurity photoeffect) is due to an electron-temperature gradient and can be considered as a kind of Nernst-Ettingshausen effect. Semiquantitative estimates and theoretical considerations lead to conclusion that, with and without magnetic field, the emf observed is indeed an "electronic" emf, caused by different electron temperatures at the crystallite faces. There are 7 figures.

ASSOCIATION: Institut radiotekhniki i elektroniki Akademii nauk SSSR (Institute of Radio Engineering and Electronics of the Academy of Sciences USSR)

Card 2/3

S/056/62/042/004/006/037
B102/B104

Some effects induced by r-f ...

SUBMITTED: November 4, 1961

Card 3/3

SIDOROV, V.I.; LIFSHITS, T.M.

Photoelectric properties of zinc and gold doped germanium.
Radiotekh. i elektron. 7 no.12:2076-2085 D '62. (MIRA 15:11)
(Transistors) (Photoconductivity)

L 10369-63 EWT(1)/BDS/EEC(b)-2--AFFTC/ASD/ESD-3--Pi-4--IJP(C)

ACCESSION NR: AP3000997 S/0109/63/008/006/0994/1001

AUTHOR: Vystavkin, A. N.; Kogan, Sh. M.; Lifshits, T. M.; Mel'nik, P. G. 64

TITLE: Electronic thermomagnetic effect 21

SOURCE: Radiotekhnika i elektronika, v. 8, no. 6, 1963, 994-1001

TOPIC TAGS: Electronic thermomagnetic effect, InSb single crystal specimen, electron concentrations, magnetic field, liquid helium temperature, cavity resonator, sensitivity, radiated power

ABSTRACT: The electronic thermomagnetic effect in InSb n-type single crystal 21 specimens has been investigated. Specimens (5 x 5 x 0.8 mm) with an electron concentration of 10 sup 14 cm sup -3 and a mobility of 0.5 x 10 sup 4 to 5 x 10 sup 4 cm sup 2/v x sec at T sub 0 = 4.2K (without magnetic field) were inserted into a cavity cooled by liquid helium. A generator provided a signal of 75 Gc and was modulated by a 1 kc square wave. The appearance of an emf across the specimen terminals caused by the applied signal was observed only in the presence of a permanent magnetic field. With an increase in the intensity of the magnetic field the emf also increased and at H approximately

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ACCESSION NR: AP3000997

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equal to 1700 oe, reached its maximum and then dropped again. It follows from the amplitude characteristics obtained that the photoresponse of the electronic thermomagnetic effect remains linear up to the signal level of 2 x 10 sup -4 w. Sensitivity was determined to be 500 v/w for specimens with carrier concentration of 10 sup 14 cm sup -3. The noise level of samples within the limits of measurement accuracy (plus or minus 50%) was found to be equal to the internal thermal resistance noise of the specimens. Consequently, the minimum detected radiated power with a signal-to-noise ratio equal to unity was 2 x 10 sup -13 w. The inertia of the electronic thermomagnetic effect, which is determined by the transfer time of excessive electron energy to the lattice, was found to be less than or equal to 3 x 10 sup -7 sec. It was noted that the described effect depends very little on the frequency and could therefore be observed during bombardmnt of the specimen by radiation over a broad spectrum. Orig. art. has: 4 figures and 23 formulas.

ASSOCIATION: none

SUBMITTED: 12Feb63 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 004 OTHER: 001

Card 2/2 ch/

KOGAN, Sh. M.; LIFSHITS, T. M.; SIDOROV, V. I.

"Photoconductivity in germanium due to the optical transitions between the impurity centers."

report submitted for Intl Conf on Physics of Semiconductors, Paris, 19-24 Jul 64.

Inst of Radio Engineering & Electronics, AS USSR

ACCESSION NR: AP4012570 S/0056/64/046/001/0395/0396

AUTHORS: Kogan, Sh. M.; Lifshits, T. M.; Sidorov, V. I.

TITLE: Optical transitions between near impurity centers and the associated photoconductivity

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 395-396

TOPIC TAGS: optical transition, tunnel effect, photoconductivity, carrier tunnel transition, semiconductor, highly doped semiconductor, germanium, zinc impurity, antimony compensation impurity

ABSTRACT: Optical tunnel transitions of carriers between nearby impurity centers of different type occurring in a semiconductor at sufficiently high impurity concentration, and the resultant characteristic photoconductivity, are investigated. This effect can also be observed when the necessary two levels are due to a single impurity with several charge states. Germanium doped with zinc and

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ACCESSION NR: AP4012570

compensated with antimony was used at liquid-helium temperature. The observed peak is attributed to an optical transition of a hole from a Zn^- ion to a nearby similar ion. A second hole of the resultant Zn^0 neutral atom wanders along the Zn^- ions and contributes to the jump in conduction. Arguments are advanced in favor of this interpretation. "The authors are grateful to S. G. Kalashnikov for valuable discussions." Orig. art. has: 1 figure.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR (Institute of Radio Engineering and Electronics, AN SSSR)

SUBMITTED: 06Nov63 DATE ACQ: 26Feb64 ENCL: 01

SUB CODE: PH NO REF SOV: 002 OTHER: 001

Card 2/2

S/0181/64/006/003/0722/0727

ACCESSION NR: AP4019829

AUTHORS: Kagan, M. S.; Lifshits, T. M.; Musatov, A. L.; Sheronov, A. A.

TITLE: Autoelectronic emission from high resistance germanium

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 722-727

TOPIC TAGS: secondary emission, semiconductor property, EMU 3 electromagnetic amplifier, volt ampere characteristic, semiconductor resistance

ABSTRACT: Studies were made on both n- and p-type germanium at temperatures of 293 and 80K. The germanium was doped with gold and compensated with antimony. The gold concentration was $5 \cdot 10^{14}$ cm^{-3} and the antimony concentration was of the same order, but chosen in such a way that the sample had high resistance at the temperature of liquid nitrogen. Resistivities attained for n-type germanium at 80K were about 10^8 ohm cm, and for p-type 10^6 ohm cm. The volt-ampere characteristics of emission and the distribution of electrons according to energy are shown in Figs. 1 and 2 on the Enclosures. They exhibit no perceptible effect of "heating

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ACCESSION NR: AP4019829

up" the electrons in the emitter. A high density of autoemission current is connected with high electron concentration at the point, exceeding the body concentration in the massive part of the emitter by a factor of thousands. The authors found that when the sample was coated with cesium the work function of the point was reduced much more than the work function of the side of the sample, apparently because of different conditions of cesium absorption, possibly because of temperature differences at the point and in the massive part of the sample. It is noted that when the electron affinity is reduced to 1.6 ev the volt-ampere characteristics are strictly linear, and this fact should attest to the effect of heating of electrons during autoelectron emission from germanium. Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radio Engineering and Electronics AN SSSR)

SUBMITTED: 03Aug63 DATE ACQ: 31Mar64 ENCL: 02

SUB CODE: EC, NP NO REF SOV: 009 OTHER: 002

Card 2/4

ENCLOSURE: 01

ACCESSION NR: AP4019829

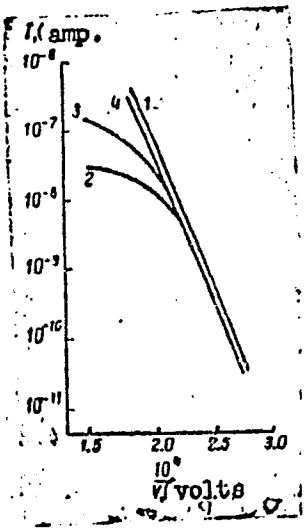

Fig. 1. Volt-ampere characteristics of autoelectron emission from germanium.

Temperature: 1 - 293K; 2-4 - 80K;
1,2 - nonirradiated samples;
3 - weakly irradiated sample;
4 - strongly irradiated sample.

Card 3/4

ACCESSION NR: AP4019829

ENCLOSURE: 02

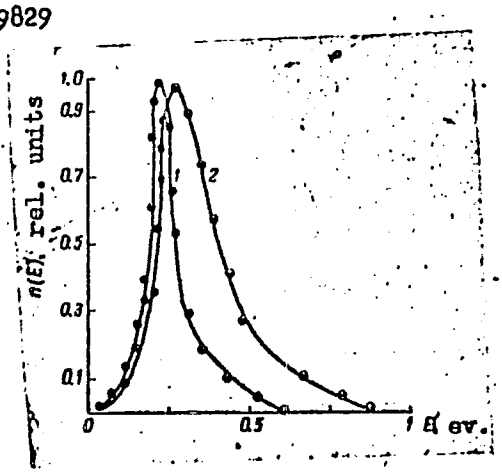

Fig. 2. Energy spectrum of emitted electrons

I: 1 - $2 \cdot 10^{-9}$ amps; 2 - $7 \cdot 10^{-9}$ amps.

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ACCESSION NR: AP4039650 S/0181/64/006/006/1657/1663

AUTHOR: Devyatkov, A. G.; Kogan, Sh. M.; Lifshits, T. M.; Oleynikov, A. Ya.

TITLE: Conductivity of n-type indium antimonide at low temperatures

SOURCE: Fizika tverdogo tela, v. 6, no. 6, 1964, 1657-1663

TOPIC TAGS: n type indium antimonide, volt ampere characteristic nonlinearity, field dependent conductivity, temperature dependent conductivity, nonlinear temperature dependence

ABSTRACT: The nonlinearity of n-type InSb volt-ampere characteristics at low temperatures and its dependence on field, temperature, and concentration are discussed. Measurements were made at about 1.5—15K on specimens with dimensions of 10 x 1.5 x 1 mm and electron concentrations of 1.8×10^{13} to 1.5×10^{15} cm^{-3} in a field range of 0.02 to 0.3 v/cm. The results of the investigation have shown that: 1) conductivity σ increases with temperature, while nonlinearity

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ACCESSION NR: AP4039650

considerably decreases both with an increase in carrier concentration and with an increase in specimen temperature; 2) in all cases, the dependence of σ on lattice temperature T_0 is markedly weaker than $T^{3/2}$; 3) at low temperatures specimens with high electron concentrations showed a saturation of $\sigma(T_0)$, which is apparently caused by the degeneration of the electron gas; 4) at a donor concentration of 10^{14} cm^{-3} and a carrier concentration of 1×10^{14} cm^{-3}, the coefficient of nonlinearity $\beta(E)$, where E is the field intensity, first increases as the field increases, reaches a maximum, and then decreases. In the region of the low fields, β increases with an increase in lattice temperature, and decreases in the region of the maximum and of higher fields, so that at high T_0, function $\beta(E)$ declines monotonically with the field. The authors explain the field and temperature dependences of σ and β by the fact that electron pulse dispersion occurs on the charged impurity, while energy dispersion occurs on the deformed and piezoelectric potential of acoustic phonons. Orig. art. has: 6 figures and 7 formulas.

Card 2/3

ACCESSION NR: AP4039650

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radio Engineering and Electronics, AN SSSR)

SUBMITTED: 16Dec63 DATE ACQ: 19Jun64 ENCL: 00

SUB CODE: EM, PH NO REF SOV: 003 OTHER: 004

Card 3/3

L 11426-65 EWT(l)/EWG(k)/EWT(m)/EEC(t)/EWP(t)/EWP(b) Pz-6 IJP(c)/SSD/
AFWL/AS(mp)-2/ESD(gs)/ESD(t) AT/JD

ACCESSION NR: AP4048403 S/0181/64/006/011/3294/3300

AUTHORS: Kogan, Sh. M.; Lifshits, T. M.; Sidorov, V. I. 15

TITLE: Photoconductivity due to optical transitions between impurity centers 21

SOURCE: Fizika tverdogo tela, v. 6, no. 11, 1964, 3294-3300

TOPIC TAGS: photoconductivity, optical transition, impurity center, impurity concentration, germanium, semiconductor doping 27

ABSTRACT: This paper reports an experimental verification of an effect theoretically deduced by the authors previously (ZhETF v. 46, 395, 1964), wherein optical transitions take place directly between neighboring impurity centers in semiconductors having high impurity concentrations. The object of the investigation was germanium doped with zinc and antimony, grown from a melt by the Czochralski method. The samples measured 6 x 2 x 2 mm and were provided with indium elec-

Card 1/2

trodes. The samples were placed in a helium cryostat with cesium iodide windows. The measurements were made in a variable light flux modulated at approximately 400 cps. The monochromatic radiation energy was measured with a calibrated vacuum thermocouple. Various mechanisms explaining the observed long-wave peak of photoconductivity are analyzed briefly and it is concluded that the observed experimental results can be best reconciled with optical transitions between the impurity centers. It is also indicated that similar effects should be observed also in other materials. "The authors thank S. G. Kalashnikov for a valuable discussion." Orig. art. has: 4 figures and 5 formulas.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moscow (Institute of Radio and Electronics, AN SSSR)

SUBMITTED: 26May64 ENCL: 00

SUB CODE: SS NR REF SOV: 003 OTHER: 003

L 61524-65 EWT(l)/EWT(m)/EEC(t)/EWP(t)/EWP(b) Pz-6 IJP(c) JD/AT

ACCESSION NR: AP5015420 UR/0020/65/162/004/0801/0802

33
32
B

AUTHOR: Lifshits, T. M.; Nad', F. Ya.

TITLE: Photoconductivity of germanium alloyed with group V admixtures at photon energies less than the ionization energy of the admixtures

SOURCE: AN SSSR. Doklady, v. 162, no. 4, 1965, 801-802

TOPIC TAGS: doped germanium, photoconductivity, germanium antimonide, germanium arsenide

ABSTRACT: Photoconductivity was studied in samples of Ge alloyed with Sb and As (concentrations of the admixtures were $\sim 3 \cdot 10^{15}$ cm^{-3} and $1 \cdot 10^{15}$ cm^{-3}, respectively). The results show that photoconductivity occurs even at photon energies which are substantially smaller than the ionization energy of the impurity atoms. This photoconductivity may be related to partially overlapping excited states, and the contribution of excited states to the impurity photoconductivity may proceed via phonon participation in electron transitions from the impurity levels into the conduction band (the photon and phonon absorption may occur consecutively or simultaneously). The strong temperature dependence of the observed photoconductivity seems to favor such a mechanism (see Fig. 1 of the Enclosure). Orig. art. has: 1 figure. [08]

Card 1/3

L 61524-65

ACCESSION NR: AP5015420

ASSOCIATION: Institut radiotekhniki i elektroniki Akademii nauk SSSR (Institute of Radio Engineering and Electronics, Academy of Sciences, SSSR)

SUBMITTED: 11Dec64 ENCL: 01 SUB CODE: MM, EM

NO REF SOV: 000 OTHER: 003 ATD PRESS: 4037

Card 2/3

L 61524-65

ACCESSION NR: AP5015420

ENCLOSURE: 01

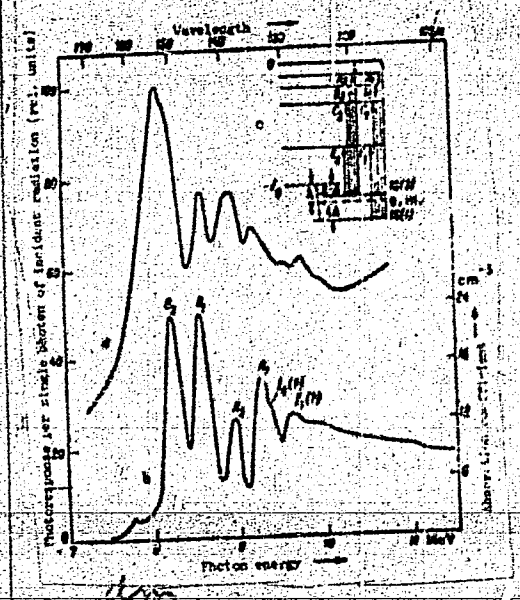

Fig. 1. a - Long wave internal of photoconductivity spectrum of GE:Sb ($N_{Sb} \sim 3 \cdot 10^{15}$ cm^{-3}); b - optical absorption spectrum of Ge:Sb ($N_{Sb} = 7 \cdot 10^{14}$ cm^{-3}) [J. H. Reuszer, P. Fisher, Phys. Rev., 135, no. 4A, 1125, 1964]; c - level diagram of optical transitions from the ground states of microdonors in Ge (E_o = ground state of electrons at the donor center in the effective mass approximation; λ = center of mass displacement; 4Δ = ground state splitting).

Card 3/3

L 6480-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h) IJP(c) JD/AT

ACC NR: AP5028015 SOURCE CODE: UR/0386/65/002/008/0365/0368

AUTHOR: Kogan, Sh. M.; Lifshits, T. M.; Sidorov, V. I.

ORG: Institute of Radio Engineering and Electronics, Academy of Sciences, SSSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

TITLE: Recombination radiation stimulated in silicon by long wavelength infrared radiation

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu (Prilozheniye), v. 2, no. 8, 1965, 365-368

TOPIC TAGS: recombination radiation, silicon, IR photoconductor, photosensitivity, spectral distribution

ABSTRACT: The purpose of the investigation was to check the conditions under which charge exchange increases the photoresponse of a semiconductor in the region of impurity absorption of light and causes the appearance of recombination radiation stimulated by light from the impurity-absorption region. The existence of such a mechanism was experimentally confirmed, using silicon doped with boron and antimony (N_B = 8×10^{13} cm^{-3}, $N_{Sb} = 2 \times 10^{14}$ cm^{-3}). A silicon sample measuring 2 x 2 x 6 mm was mounted in a standard helium cryostat, in which the sample could be cooled to 7--9K. The sample was illuminated through a cold window (filter) of indium antimonide with modulated monochromatic radiation in the wavelength range from 8 to 20 μ. The sample could be simultaneously exposed to unmodulated light from a small incandescent lamp placed in a cryostat. Besides the sample, a commercial germanium photodiode with a

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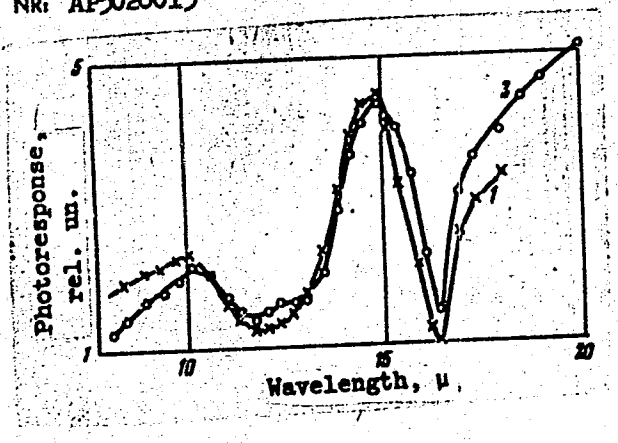

Fig. 1. Spectral distribution of the photocurrent in a silicon sample (2) and in a germanium photodiode (1), relative to the monochromatic power incident in the InSb cold filter

glass entrance window was mounted in the cryostat so that it could register the possible radiation from the sample. The photoresponses of the sample and of the photodiode were registered with a standard measuring circuit, including an amplifier, a synchronous detector, and an automatic recorder. The photodiode did not respond to the modulated IR radiation unless the additional lamp was also on, or, conversely, to the additional lamp alone without the IR radiation. On the other hand, when the sample was simultaneously illuminated by the lamp and by the modulated IR radiation from

L 6480-66

ACC NR: AP5028015

the monochromator, a photoresponse signal at the frequency of the IR-radiation modulation was produced by the germanium photodiode (Fig. 1). The figure shows the spectral distribution of the photoresponse of the germanium photodiode (Curve 1) as well as the spectral curve of the photocurrent from the silicon sample (Curve 2). The photodiode signal and the photoresponse of the sample depend on the intensity of the unmodulated illumination. The photocurrent induced in the sample by the illumination could increase by a factor of more than 100, but without a change in the spectral distribution of the photoconductivity. The agreement between the spectral distribution of the silicon sample and the germanium photodiode, together with the fact that the photoresponse of the diode is produced only by simultaneous exposure of the silicon sample to the monochromatic radiation and the additional illumination, shows decisively that recombination radiation stimulated by long wavelength IR light occurs in charge-exchanged silicon. It is thus proved that the long wavelength radiation was transformed in this experiment into short wavelength radiation with an appreciable gain (by a factor ~20) in the photon energy. Authors thank K. I. Svistunova for supplying the test material. Orig. art. has: 1 figure. [02]

SUB CODE: OP/ SUBM DATE: 07Aug65/ ORIG REF: 002/ ATD PRESS: 4140

Card 3/3

L 11951-66 EWT(1)/EWT(m)/EWP(t)/EWP(b)/EWA(m)-2 IJP(c) JD/AT

ACC NR: AP6000739 SOURCE CODE: UR/0386/65/002/009/0423/0426

AUTHOR: Lifshits, T. M.; Oleynikov, A. Ya.; Shul'man, A. Ya.

ORG: Institute of Radio Engineering and Electroncis, Academy of Sciences, SSSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

TITLE: Scattering of electron gas energy in n-InSb at helium temperatures

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 9, 1965, 423-426

TOPIC TAGS: indium alloy, electron collision, electric conductivity, relaxation process, temperature dependence, electron gas, crystal lattice

ABSTRACT: To study the energy scattering mechanisms in InSb, the authors investigated the field and temperature dependences of the time of electric conductivity relaxation of n-InSb samples, which is simultaneously the time required to transfer the excess average energy from the electron gas to the crystal lattice. The tests consisted of measuring the active and reactive components of the complex admittance of a sample with nonlinear voltage-current characteristic, and calculating from these components the relaxation time τ of the average energy for each value of the lattice temperature and of the power dissipated in the sample. It is noted that the electric-conductivity relaxation time depends on the circuit parameters and on the manner in which the sample is connected in the circuit, this being the consequence of the pump action of the battery. To compare the obtained data with theory, the authors used

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ACC NR: AP6000739 3

the results of a calculation of the electron energy loss function P(T) for scattering by the piezoelectric and deformation potentials of the acoustic phonons and by the optical phonons, obtained by Sh. M. Kogan (FTT v. 4, 2474, 1962) and H. Frohlich and B. V. Paranjape (Proc. Phys. Soc. v. B69, 21, 1956), respectively. Comparison of the experimental and theoretical curves leads to the conclusion that the nonmonotonic dependence of τ_p on T is connected with the interchange of mechanisms for the transfer of energy to the lattice from the electron gas when the temperature of the latter increases. When $T < 8K$, energy scattering by the piezoelectric potential of the acoustic phonons predominates. At electron temperatures $T \geq 10K$, the agreement between theory and experiment is only qualitative. Authors are grateful to Sh. M. Kogan for a valuable discussion. Orig. art. has: 1 figure and 1 formula. 44,55

SUB CODE: 20/ SUBM DATE: 08Sep65/ ORIG REF: 003/ OTH REF: 002

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Card 2/2

L 22080-66 EWT(m)/EWP(t) IJP(c) JD/JXT(HS)

ACC NR: AP6008740 SOURCE CODE: UR/0386/66/003/003/0134/0137

AUTHOR: Lifshits, T. M.; Musatov, A. L. 5 13

ORG: Institute of Radio Engineering and Electronics, Academy of Sciences SSSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

TITLE: Infrared-controlled field emission from germanium 21

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 3, 1966, 134-137

TOPIC TAGS: germanium, field emission, infrared radiation, photoconductivity

ABSTRACT: This is a continuation of an earlier investigation (Fiz. tverdogo tela v. 6, 722, 1964) of field emission from single-crystal Ge doped with Au, where it was shown that on cooling to liquid-nitrogen temperature the field-emission current is limited by the volume resistivity of the sample, and that a sharp increase in the emission current occurs in the region of voltages at which the volt-ampere characteristic is essentially nonlinear when the sample is illuminated and its resistance reduced thereby. In the present investigation the authors measured the spectral distribution of the additional emission current due to application of infrared radiation. Germanium samples doped with gold and compensated with antimony

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(n and p type) were made in the form of rods measuring 15 x 1 x 1 mm, pointed on one end by electromechanical etching. The radius of the point, as measured with an electron microscope, was 0.1--0.5 μ. The samples were mounted in the nitrogen cryostat described in the earlier paper with the point facing the anode. One of the faces of the sample could be illuminated with infrared from a monochromator (KS-12) modulated at 400 cps. A germanium filter was used in measurements in the 2--7 μ range to eliminate the scattered light. Plots are presented of the spectral distribution of part of the emission current (per unit incident-radiation power) caused by illumination, for n- and p-type samples (Fig. 1). The results show that it is possible to control the electron emission from the semiconductor with infrared of wavelength from 1 to 6 or 7 μ, whereas other presently known photoemission cathodes emit electrons only under the influence of light with wavelength $\lambda < 1.5$ μ. From the parameters of the semicon-

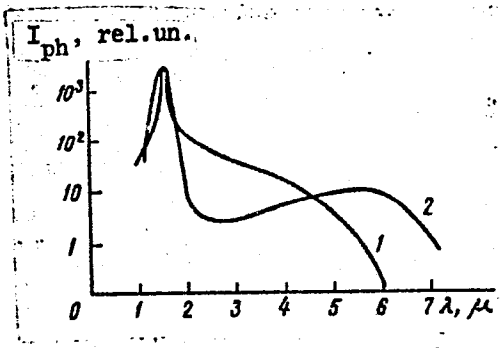

Fig. 1. Spectral characteristics of light-controlled emission from germanium. 1 - n-type, 2 - p-type

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ACC NR: AP6008740

ductor and from the volt-ampere characteristic the authors calculate the quantum yield of the described infrared cathode for the region of impurity absorption of light. For standard high-resistivity samples of n-germanium doped with gold at an anode-cathode voltage 4×10^3 v the calculated quantum yield for the wavelength $\lambda = 2\ \mu$ is 0.12 electron/photon. The experimentally obtained value of the quantum yield for this wavelength is 0.06 electron/photon. This corresponds to a cathode photosensitivity ≈ 2.5 a/w. The results disclose the operating peculiarities of this cathode: the need for an initial dark current (4.5×10^{-8} a) and the decrease in photosensitivity at large light intensity incident on the sample. It is concluded that, subject to a suitable choice of semiconductor and doping impurity, the method can be used to construct a field-emission cathode which is sensitive to practically any region of the infrared spectrum. Orig. art. has: 1 figure and 2 formulas. [02]

SUB CODE: 20/ SUBM DATE: 17Dec65/ ORIG REF: 001/ OTH REF: 001
ATD PRESS: 4229

Card 3/3 BLG

L 23463-66 EWT(1)/EWT(m)/EEC(k)-2/T/EWP(t)/EWP(k) LJP(c) WG/JD

ACC NR: AP6012806 SOURCE CODE: GE/0030/66/014/002/0511/0521

AUTHOR: Lifshits, T. M.; Oleinikov, A. Ya.; Shulman, A. Ya.

ORG: Institute of Radio Engineering and Electronics, Academy of Sciences of USSR, Moscow

TITLE: On the electron gas energy relaxation mechanisms in n-type InSb at helium temperatures

SOURCE: Physica status solidi, v. 14, no. 2, 1966, 511-521

TOPIC TAGS: indium antimonide, relaxation energy, piezoelectric scattering, phonon, crystal lattice, Hall constant, electric conductivity

ABSTRACT: The relaxation time of the electrical conductivity (σ) and the nonlinear coefficient β were investigated in n-type InSb as a function of the dc power applied to the samples. Measurements of the active and reactive components of σ were performed between 1.8 and 4.1K. Samples 10 x 1 x 1 mm with an excess electron concentration = $3—5 \times 10^{13}$ cm^{-3} and a mobility $\approx 2—5 \times 10^{4}$ cm^2/v·sec were used in the experiments. It was established that the average electron relaxation time in InSb at helium temperatures depends on the power supplied to the sample. This dependence is not monotonic, due to the change of

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mechanisms of energy transfer to the lattice from the electron gas during increase of its temperature. When the temperature of the lattice is that of liquid helium and the electron temperature is less than 8K, the predominant mechanism of energy loss is the loss by the piezoelectric potential of acoustic phonons. This mechanism determines the increase of τ with T and also the S-type shape of the dc current-voltage characteristic at low lattice temperatures. The deformation potential of acoustic phonons contributes relatively little to the energy loss. From the data on τ/T it was determined that the piezoelectric modulus in InSb $e_{14} = 2.6 \times 10^4$ dyn$^{1/2}$ cm^{-1} and that the deformation potential constant $\mathcal{E}_c < 10$ eV. At T $\geq$ 10K the predominant energy loss mechanism is the generation of optical phonons. However, it is necessary to calculate a special electron energy distribution function in the electrical field to take into account this dissipation.

The authors are grateful to Sh. M. Kogan for valuable discussion, to G. A. Zhurkina for performing the computations, and to Yu. E. Barkalov and E. A. Lobodayev for their assistance in carrying out the measurements. Orig. art. has: 9 formulas and 6 figures. [CS]

SUB CODE: 20/ SUBM DATE: 07Feb66/ ORIG REF: 008/ OTH REF: 010
ATD PRESS: 4236

L 42816-66 EWT(l)/EWT(m)/EWP(t)/ETI IJP(c) JD/AT

ACC NR: AP6024481 SOURCE CODE: UR/0181/66/008/007/2149/2153

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B

AUTHOR: Lifshits, T. M.; Nad', F. Ya.

ORG: Institute of Radio Engineering and Electronics, AN SSSR, Moscow (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: Impurity photoconductivity of n-InSb in strong magnetic fields

SOURCE: Fizika tverdogo tela, v. 8, no. 7, 1966, 2149-2153

TOPIC TAGS: impurity conductivity, strong magnetic field, indium alloy, antimony alloy, photoconductor, photoconductivity

ABSTRACT: The subject of the present article is the investigation of the spectral dependence of the long-wave photoconductivity of n-InSb in a strong magnetic field in the 700-2000 mμ wavelength region, and the direct measurement of the photoionization energy of small donors in this material. The long-wave photoconductivity of n-InSb at 1.8K in magnetic fields of 10–35 ke has a spectral characteristic which is typical of normal impurity photoconductivity with a well-defined decay toward long waves. The position of the long-wave boundary determined by the half-decay point of the photoresponse at various magnetic fields agrees in practice with the thermal energy of ionization obtained from the linear slope of the Hall coefficient temperature-dependence curves. The narrowing of the spectral characteristic of the impurity photoconductivity with an increase in the magnetic field indicates, apparently, that

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ACC NR: AP6024481

with an increase in the magnetic field an increasingly greater significance is acquired by the optical shifts of electrons to the lower part of the continuous spectrum formed by the superposed excited states of the donor centers. The authors are grateful to Sh. M. Kogan for valuable discussions. Orig. art. has: 2 figures. [26]

SUB CODE: 20/ SUBM DATE: 23Dec65/ ORIG REF: 006/ OTH REF: 006 ATD PRESS: 5067

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L 04406-67 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) DS/JD/AT/JH
ACC NR: AP6034421 SOURCE CODE: UR/0386/66/004/008/0295/0298

AUTHOR: Lifshits, T. M.; Musatov, A. L.

ORG: Institute of Radio Engineering and Electronics, Academy of Sciences SSSR (Institut radiotekhniki i elektroniki Akademii nauk SSSR)

TITLE: Photoelectronic emission from aluminum - aluminum oxide - gold film system

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 4, no. 8, 1966, 295-298

TOPIC TAGS: aluminum, aluminum oxide, gold, photoelectron, electron emission, volt ampere characteristic, quantum yield

ABSTRACT: The authors observed photoelectronic emission from the system Al-Al_2O_3-Au when a strong electric field was applied to the dielectric. The preparation of the film system is described. The investigated samples were illuminated through the upper semitransparent electrode with monochromatic light from a spectrophotometer with an incandescent lamp as a light source. All measurements were made with direct current. When no voltage was applied to the system photoelectrons are emitted only from the upper electrode. When several volts were applied to the film system (with the upper electrode positive), noticeable photoemission to the vacuum appeared in the spectral region 0.5 - 1 μ. Comparison with the spectral characteristic of the photoelectronic emission from aluminum to the aluminum oxide at the same system voltage (photocurrent between the metallic electrodes of the film system) showed that the spectral depen-

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ACC NR: AP6034421

ence of the photoelectronic emission into vacuum from this system coincided in the region from 0.5 to 1 μ with the spectral dependence of the photoelectronic emission from the aluminum to the aluminum oxide, indicating that the source of the photoelectrons is the aluminum film for both external photoemission and photocurrent between metal electrodes. The volt-ampere characteristic of the photoemission shows that the photoemission sets in at approximately 4 v on the film system and increases rapidly with increasing voltage. When the polarity of the voltage is reversed, the external photoemission in the 0.5 - 1 μ region disappears. It is thus deduced that photoelectronic emission from aluminum to aluminum oxide, and emergence of photoelectrons to the vacuum through a thin gold film, occur under the influence of an electric field in the dielectric. The long-wave limit of this photoemission is determined by the height of the barrier at the metal-dielectric interface and decreases with increasing field in the film. The low values of the quantum yield of photoemission from the metal into the dielectric (~10^{-5} el/photon) and of the photoemission into vacuum (~10^{-8} el/photon) are peculiar to this system and to the technology used in its manufacture, and in other systems the quantum yield of photoemission from the metal into a dielectric reaches high values. The authors thank D. V. Zernov for a discussion of the results. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 14Jul66/ ORIG REF: 001/ OTH REF: 003

Card 2/2 vmb

ACC NR: AP6036959 (A, N) SOURCE CODE: UR/0181/66/008/011/3208/3212

AUTHOR: Lifshits, T. M.; Sidorov, V. I.; Nad', F. Ya.

ORG: Institute of Radio Engineering and Electronics, AN SSSR, Moscow (Institut radiotekhniki i elektroniki AN SSSR)

TITLE: Extrinsic photoconductivity of germanium doped with antimony, arsenic, boron, or indium

SOURCE: Fizika tverdogo tela, v. 8, no. 11, 1966, 3208-3212

TOPIC TAGS: photoconductivity, impurity conductivity

ABSTRACT: The spectral distribution of the extrinsic photoconductivity of germanium containing various amounts of Sb, As, B and In ($6 \times 10^{13} - 6 \times 10^{17}$ cm^{-3}) was studied. Data on the impurity concentrations, charge carrier mobilities and ionization energies of the impurities in the samples studied are given. They show that as the concentration of the donor impurity N_d increases, the thermal ionization energy ϵ_t decreases considerably and it is equal to zero when $N_d = 6 \times 10^{17}$ cm^{-3}. Data are presented on the shape of the spectral photoconductivity curve as a function of the concentration of the n- and p-impurities in germanium and of the magnitude of the electric field in the samples. In conclusion, authors thank N. P. Likhtman, who measured the electrophysical parameters of the series of samples of doped germanium. Orig.

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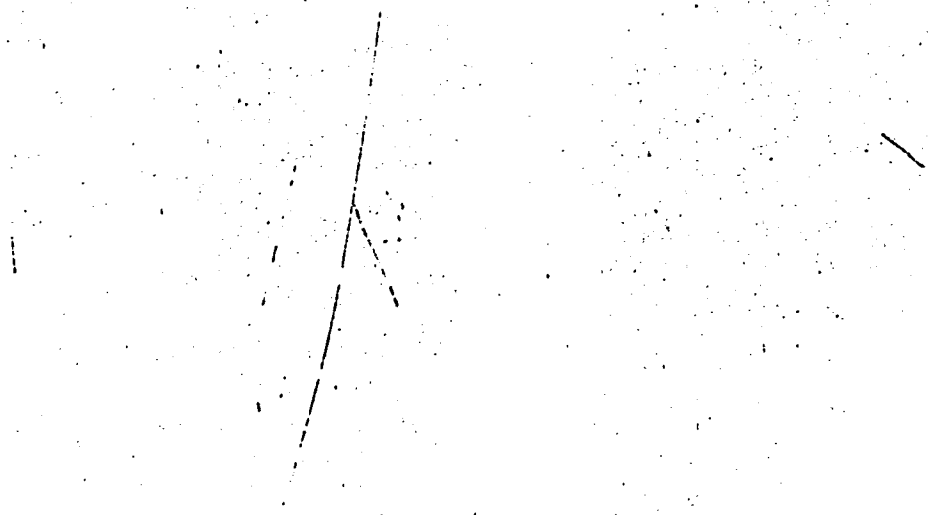
ACC NR: AP6036959

art. has: 6 figures and 1 table.

SUB CODE: 20/ SUBM DATE: 21Mar66/ ORIG REF: 004/ OTH REF: 005



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LIFSHITS, [illegible]

Review of output norms. Sots. trud. no.8:73-77 Ag '58. (MIRA 11:9)
(Production standards)

SMIRNOW, Ye.; LIFSHITS, V.

Improving the establishment of norms is an important means for increasing labor productivity. Sots.trud 8 no.3:86-93 Mr '63. (MIRA 16:3)

(Production standards)

LIFSHITS, V., mladshiy nauchnyy sotrudnik

Meteorological navigation. Mor. flot 24 no.3:42-44 Mr '64.
(MIRA 17:6)

1. TSentral'nyy institut prognozov.

ABRAM P.Ya.; ALEKSANDROVA, G.I.; VOL'SKIY, V.S.; GORDON, Kh.I.; KLIMOVICH, A.I.; LIFSHITS, V.A.; FEDOTOV, F.G.[deceased]; AVKSENT'YEV, P.A.,[retsenzent]; ZAKHAROV, N.N.[retsenzent]; KOCHANOV, M.I.[retsenzent]; LEKSASHOV, P.P.[retsenzent]; NOVIKOV, V.F.[retsenzent]; SOKOLOV, M.V.[retsenzent]; SHESTOPAL, V.M.[retsenzent]; YAKOBSON, M.O.[retsenzent]; GAL'TSOV, A.D., red.; STRUZHESTRAKH, Ye.I., red.; KHISIN, R.I., red.; SEMENOVA, M.M., red. izd-va; POCHTAREVA, A.V., red. izd-va; TIKHANOV, A.Ya., tekhn. red.; MODEL', B.I., tekhn. red.

[Handbook for the establishment of norms in the machinery industry in 4 volumes]Spravochnik normirovshchika-mashinostroitelia v 4 tomakh. Moskva, Mashgiz, Vol. 4. [Engineering norms in auxiliary shops]Tekhnicheskoe normirovanie vo vspomogatel'nykh tsekhakh. 1962. 478 p. (MIRA 16:2)
(Machinery industry--Production standards)

KURENKOV, Yu.V., kand.ekonomicheskikh nauk; KOKOREV, V.A., inzh.; LIFSHITS, V.B., inzh.

Standard types of reeling, warping and dressing machines. Mekh.i avtom.proizv. 16 no.8:32-37 Ag '62. (MIRA 15:9)
(Textile machinery)

LIFSHITS, V. G.

Lifshits, V.G.

1-RS

8958* (Russian.) The Order-Disorder Mechanism in the Alloy Ni_3Mn With Various Additions of Molybdenum. O mekhanizme uporiadocheniia splava Ni_3Mn s razlichnymi prisadkami molibdena. V. G. Lifshits, B. V. Molotilov, N. N. Müller, and N. A. Savostianova. *Fizika Metallov i Metallovedenie*, v. 3, no. 3, 1956, p. 417–482.

The order-disorder process in the binary alloy Ni_3Mn, and a ternary Ni-Mn-Mo alloy takes place as a phase transformation.

4

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MT

RS

SOV/94-58-12-5/19

AUTHORS: Grodskiy, S.Ye., Engineer
Kudryashov, S.A.,
Lifshits, V.L. and Rattel', K.N.

TITLE: On the Ventilation of Transformer Chambers (K voprosu o ventilyatsii transformatornykh kamer)

PERIODICAL: Promyshlennaya Energetika, 1958, Nr 12, pp 12-14 (USSR)

ABSTRACT: Under this heading there are three separate short articles discussing the article by Shnitser, Zotov and Khesin published in Promyshlennaya Energetika, 1957, Nr 12.

Grodskiy, S.Ye., pp 12-13

This author considers that the original article correctly states that it is not necessary to provide ventilation shafts in closed transformer chambers for outputs up to 1 MVA. The author's institute is designing transformer chambers of this kind. However, various objections are raised to the ventilation arrangements proposed by the authors. The air resistance formulae that they give are not accurate. The recommended ventilation arrangements are not satisfactory. The

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On the Ventilation of Transformer Chambers

practical experience of transformer cooling noted in the article is not sufficient. The latest design of transformer chamber used by the author's organisation overcomes these defects and is briefly described with reference to the sketch. Air reaches the transformer from one side and from underneath and leaves near the top. This method of construction has been successful in practice.

ASSOCIATION: Giprotraktorosel'khozmash

Kudryashov, S.A., p 13

This author states that the original authors should not have used the maximum permissible outlet air temperature at 45°C but should have used a mean temperature of 40°C. Therefore, the table of ventilating duct areas gives values that are too low.

ASSOCIATION: GPI Elektroproyekt, g.Kuybyshev (State Planning Institute Elektroproyekt in Kuybyshev)

SOV/94-58-12-5/19

On the Ventilation of Transformer Chambers

Lifshits, V.L., and Rattel' K.N., p 14

Operating experience with transformer substations in textile factories in Central Asia which are fully loaded all day shows that the recommended method of ventilation is not adequate in this case. In such circumstances, the use of ventilating shafts has been found very effective. In the test results described in the original article insufficient reference is made to climatic conditions. The authors' organisation has to use more generous ventilation arrangements than are recommended in the article.

ASSOCIATION: Gosudarstvennyy proyektnyy institut Nr 1 (The State Design Institute Nr 1)

Card 3/3

KUYDICH. S.A., inzh.; LIFSHITS, V.L., inzh.

Deformation calculations for composite structures of the crane boom type. Prom. stroi. 40 no.7:35-38 Jl '63. (MIRA 16:10)

1. Proyektnyy institut Promstal'konstruktsiya.